Linnæus University

Course syllabus

Faculty Board of Science and Engineering
School of Engineering

1BY012 Byggnadsmekanik, 7,5 högskolepoäng
Structural Mechanics, 7.5 credits

Main field of study
Civil Engineering

Subject Group
Building Technology

Level of classification
First Level

Progression
G1F

Date of Ratification
Approved by Organisational Committee 2009-12-15

The course syllabus is valid from autumn semester 2010

Prerequisites
Physics B, Mathematics D.

Expected learning outcomes

After completing the course the student is expected to be able to:

- classify a truss by one of the following categories: mechanism, statistically determinate or indeterminate, and calculate the internal forces appearing in a statically determinate truss
- account for and calculate the section-forces in a beam (both statically determinate and indeterminate) exposed to different types of in-plane loading
- calculate on the basis of section-forces normal and shear stresses in a mono-symmetric beam and in an axis subjected to torque
- calculate the deformations appearing in beams, bars and axes
- account for situations when instability phenomena may appear and calculate the critical load
- account for the linear-elastic and elastic-ideal-plastic material models and calculate elastic and plastic moment

capacity for a mono-symmetric beam section.

Content

The course comprises the following elements:

- the concepts of stress and strain

- section-forces in beams, bars and axes exposed to different types of loading
- analyses of statically determinate and indeterminate beams
- analyses of statically determinate trusses
- stresses in beams exposed to bending and normal forces and axes exposed to torque
- the differential equation of the deflection curve describing beam deformation
- bar deformation
- second-order effect and instability
- linear-elastic and elastic-ideal-plastic material assumptions
- elastic and plastic moment capacity for beam sections.

Type of Instruction
The teaching consists of lectures, laboratory work and exercises. Participation in course laboratory work is
compulsory.

Examination
The course is assessed with the grades U,3,4 or 5.
On request, students may have their credits translated to ECTS-marks. Such a request must be sent to the examiner before the grading process starts.

The assessment of student performances is generally written and takes place during special examination periods. The assessment may also be based on submitted presentations of laboratory work and assignments.

Course Evaluation
A written course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The course evaluation will be filed at the department.

Credit Overlap
Overlaps fully with MTA919/MT9191, BYA912.

Other
On request, a Swedish University course certificate will be awarded upon successful completion of the course.

Upon request, a Swedish University degree will be issued upon successful completion of the full demands for that degree.

Required Reading and Additional Study Material
Required reading
S. Heyden, O. Dahlblom, A. Olsson, G. Sandberg, *Introduktion till Strukturmekaniken*, KFS, Lund, 2004. 240/272 sidor.